

**REMARKS****Claim Status**

Claims 24-47 are pending in the application. Claims 31-40, 45 and 46 were withdrawn by the Examiner as being drawn to a non-elected invention. Claims 24 and 47 have been amended. Withdrawn Claims 31 and 36 have been amended.

**Claim Amendments**

Claims 24, 31, 36 and 47 have been amended to more particularly point out and define the claimed subject matter.

**Interview summary**

A telephonic Interview has been held between Alexander Akhiezer, Attorney for Applicants, and the Examiner Khanh T. Nguyen on July 6, 2009, for the above-identified application.

The rejections of claims raised by the Examiner in the Office Action mailed on May 6, 2009, were discussed. Parties agreed that Claims 24 and 47 will be amended to clarify the claimed subject matter.

**Reply to the Examiner's note (paragraph 5 of the Office Action)**

The Examiner stated on page 3, paragraph 5 of the Office Action, mailed on May 6, 2009, that Claims 24-27, 30 and 47 contain the "optional" language, such as "if" and "optionally substituted". The Examiner asserted that the prior art need not teach the optional component or substitution to be anticipatory.

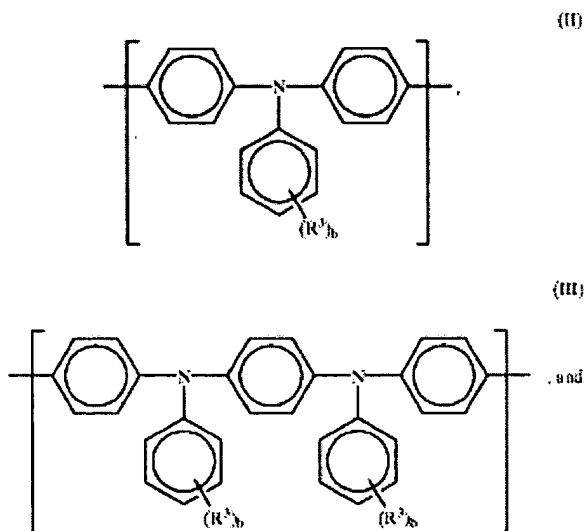
Independent Claims 24 and 47 have been amended to more particularly point out and define the claimed subject matter. Specifically, Claims 24 and 47 have been amended by deleting the phrase "optionally substituted" from the description of variable E. Claims 24 and 47 now specify that at least one E is a phosphorus atom. Furthermore, Claims 24 and 47 have been amended to recite that when E is an unsubstituted atom, the second repeat unit of the polymer defined in Claims 24 and 47 is directly conjugated to the first repeat unit. Applicants submit that

independent Claims 24 and 47, as amended, and Claims 25-27 and 30, dependent on Claim 24, are novel and non-obvious over references of record for the reasons discussed in details below.

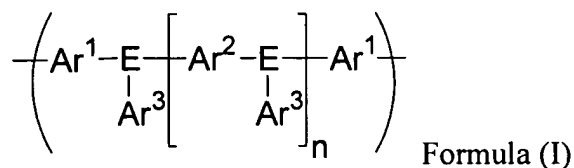
Rejection of Claims 24-30, 41-43 and 47 under 35 U.S.C. §102(b)

Claims 24-30, 41-43 and 47 have been rejected under 35 U.S.C. §102(b) as being anticipated by Woo *et al.*, US Patent No. 6, 309, 763, (hereinafter "Woo").

The Examiner stated that the conjugate groups of Formulas (II) and (III) (reproduced below) of Woo are readable on the first repeating unit of the instant invention, when **each** E is **nitrogen**, each Ar<sup>1</sup>, Ar<sup>2</sup> and Ar<sup>3</sup> is the same or different and independently represent an aryl, such as phenyl, and n is zero and one, respectively.



Applicants respectfully disagree with the Examiner's statement. Claim 24, as amended, is directed to the repeating unit of Formula (I) (reproduced below) in which **at least one** E is a phosphorus atom.



Conjugate groups of Formulas (II) and (III) of Woo require that **each** E is **nitrogen**, in contrast with amended Claims 24 and 47, which require **at least one** E to be a **phosphorus** atom.

Therefore, repeating units of Formulas (II) and (III) of Woo do not anticipate amended Claims 24 and 47.

Moreover, independent Claims 24 and 47 and claims dependent thereon are also non-obvious over Woo, as discusses in details in the Amendment filed on March 20, 2009, on pages 9-10, in addressing rejection of Claims 24-30 and 41-43 under 35 U.S.C. §102(b) in view of Woo. Applicants argued that the instant invention is non-obvious over Woo for the reasons reproduced below.

There is no suggestion or motivation disclosed in Woo that at least one of the nitrogen atoms in Formula (II) and/or (III) of Woo could be replaced by phosphorous. Additionally, Woo does not provide any reason to replace nitrogen with phosphorous.

Furthermore, one of the ordinary skill in the art would not have found it obvious to replace nitrogen with phosphorous in Formula (II) and/or (III) of Woo. It is well established in Patent Law that it is improper to assume that different chemical structures would have the same properties, absent a teaching of equivalency in the prior art:

Upon review of this history, we have concluded that generalization should be avoided insofar as specific chemical structures are alleged to be *prima facie* one from the other. [...] [I]n the case before us there must be adequate support in the prior art for the ester/thioester change in structure in order to complete the PTO's *prima facie* case and shift the burden of going forward to the applicant. (In Re Grabiak, 226 USPQ 870 at 872 (CAFC 1985)).

The court of In Re Grabiak further held:

The Bollinger teaching of various heterocyclic rings containing two sulfur atoms or one oxygen and one sulfur atom, rings which are unlike any part of the Howe molecule, does not suggest the interchangeability of sulfur and oxygen in the ester moiety of the Howe molecule. (*Ibid.*)

Applying In Re Grabiak to the facts of the present case, absent some structure-activity data indicating phosphorous/nitrogen equivalency, it is improper to assume that replacement of one element by another (nitrogen by phosphorous) would result in the similar electroluminescent characteristics for the two polymers. As such, it is not reasonable to expect that the teachings of Woo (nitrogen containing repeat units) could be applied to phosphorous containing units with a

reasonable expectation of success (see also Takeda Chemical v. Alphapharm, 492 F.3d 1350, 83 U.S.P.Q.2D 1169 (C.A.F.C. 2007)<sup>1</sup>).

Additionally, as discussed in Amendment filed on March 20, 2009, Applicants invention has numerous advantages over prior art amine-containing polymers as stated on page 14, lines 3-15, of the application as originally filed (reproduced below).

The present inventors have identified numerous advantages of the polymers according to the invention as compared to prior art amine-containing polymers, as follows.

The polymers according to the invention have a significantly larger HOMO-LUMO bandgap ( $E_g$ ) than comparative polymer not containing repeating units according to formula (I) (compare Table 1 below). Furthermore, the polymers according to the invention have bluer 1931 PAL CIE co-ordinates for both photoluminescence (PL) and electroluminescence (EL) (compare Table 2 below).

In addition, the present inventors have found that a small red peak is observed in the electroluminescent spectrum of several amine-containing polymers. In contrast, this peak is absent in the electroluminescent spectra of polymers according to the invention.

Other advantages of the phosphines according to the invention over prior art amines are higher external quantum efficiency and current ca. 2.5 times higher for polymers according to the invention.

In the view of the above, Applicants submit that independent Claims 24 and 47, as amended, are novel and non-obvious over Woo. Claims 25-30 and 41-43 depend directly or indirectly from independent Claim 24 and, therefore, are novel and non-obvious over Woo. Reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b) are respectfully requested.

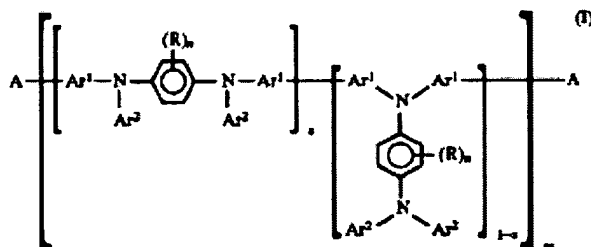
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<sup>1</sup> [The] test for prima facie obviousness for chemical compounds is consistent with the legal principles enunciated in *KSR*. [...] Thus, in cases involving new chemical compounds, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of a new claimed compound. (492 F.3d 1350 at 1356 and 1357)(*emphasis added*)

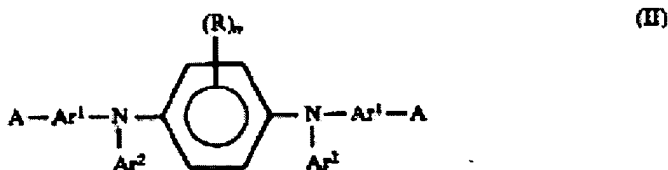
Rejection of Claims 24-30, 41-43 and 47 under 35 U.S.C. §102(b)

Claims 24-30, 41-43 and 47 have been rejected under 35 U.S.C. §102(b) as being anticipated by Wu *et al.*, US Patent No. 5, 728, 801, (hereinafter "Wu").

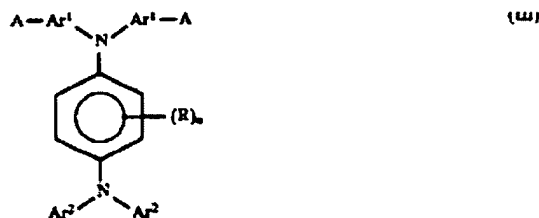
The Examiner stated that Wu teaches a poly(arylamine) composition comprising one or more compound of Formula (I) (reproduced below), which is prepared by bounding about 5 to about 100 monomers illustrated in Formulas (II) and (III) (reproduced below). Furthermore, the Examiner stated that monomer of Formula (II) of Wu is readable on the first repeating unit of instant Claim 24 when **each** E is **nitrogen**, each Ar<sup>1</sup> is the same or different and independently represent an aryl, such as phenyl, and n is zero.



Formula (I)

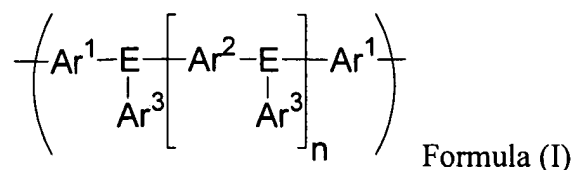


Formula (II) and



Formula (III)

Applicants respectfully disagree with the Examiner's statement. As stated above, Claims 24 and 47, especially as amended, require that **at least one E** in the first repeating unit of Formula (I) (reproduced below) is a **phosphorus** atom.



As noted above, monomer of Formula (II) of Wu requires that **each** E is **nitrogen**, in contrast with the current application, which requires **at least one E** to be **phosphorus**. Therefore, repeating units of Formula (II) of Wu do not anticipate independent Claims 24 and 47 of the instant application.

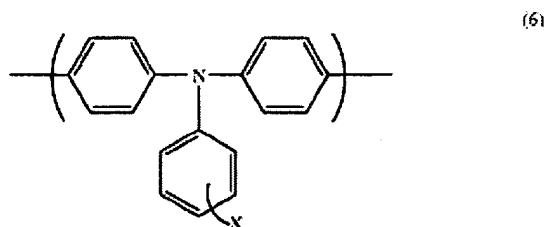
Moreover, Claims 24, 47 and claims dependent thereon are also non-obvious over Wu, for the same reasons discussed in above, with reference to Woo. There is no suggestion or motivation disclosed in Wu to replace at least one of the nitrogen atoms in Formula (II) of Wu with a phosphorous. Furthermore, one of the ordinary skill in the art would not find it obvious to replace nitrogen with phosphorous in Formula (II) of Wu, as discussed previously. In addition, Applicants invention has numerous advantages over amine-containing polymers as stated previously on page 11 of this response.

In the view of the above, Applicants submit that independent Claims 24 and 47, as amended, are novel and non-obvious over Wu. Furthermore, Claims 25-30 and 41-43 depend directly or indirectly from independent Claim 24 and, therefore, are novel and non-obvious over Wu. Reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b) are respectfully requested.

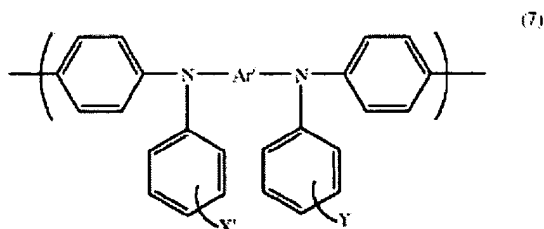
#### Rejection of Claims 24-30, 41-43 and 47 under 35 U.S.C. §102(e)

Claims 24-30, 41-43 and 47 have been rejected under 35 U.S.C. §102(e) as being anticipated by O'Dell *et al.*, US Patent No. 7, 351, 788, (hereinafter "O'Dell").

The Examiner stated that O'Dell teaches a method for making a polymer that may contain a first repeat unit of formulas (6) and (7) (reproduced below), wherein the first repeat unit of formulas (6) and (7) would be readable on the first repeating unit when each when **each** E is **nitrogen**, each Ar<sup>1</sup>, Ar<sup>2</sup> and Ar<sup>3</sup> is the same or different and independently represent an aryl, such as phenyl, and n is zero and one, respectively.

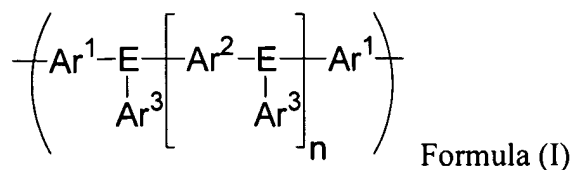


Formula (6) and



Formula (7)

Applicants respectfully disagree with the Examiner's statement. As stated above, Claims 24 and 47 require that **at least one E** in the first repeating unit of Formula (I) (reproduced below) is a **phosphorus** atom.



As noted above, repeat unit of Formulas (6) and (7) of O'Dell requires that **each E** is **nitrogen**, in contrast with Claims 24 and 47, especially as amended, which require **at least one E** to be **phosphorus**. Therefore, repeating units of Formulas (6) and (7) of O'Dell do not anticipate independent Claims 24 and 47 of the instant application.

Moreover, Claims 24, 47 and claims dependent thereon are also non-obvious over O'Dell, for the same reasons discussed in details above, with reference to Woo. There is no suggestion or motivation disclosed in O'Dell to replace at least one of the nitrogen atoms in Formula (6) and/or (7) of O'Dell with a phosphorous atom. Furthermore, one of the ordinary skill in the art would not have found it obvious to replace nitrogen with phosphorous in Formula (6) and/or (7) of O'Dell, as discussed previously. In addition, Applicants invention has

numerous advantages over prior art amine-containing polymers as stated previously on page 11 of this paper.

In the view of the above, Applicants submit that independent Claims 24 and 47, as amended, are novel and non-obvious over O'Dell. Claims 25-30 and 41-43 depend directly or indirectly from independent Claim 24 and, therefore, are novel and non-obvious over O'Dell. Reconsideration and withdrawal of the rejection under 35 U.S.C. §102(e) are respectfully requested.

Rejection of Claim 44 under 35 U.S.C. §103(a)

Claims 44 have been rejected under 35 U.S.C. §103(a) as being unpatentable over either Woo, Wu or O'Dell as applied to the above claims, and further in view of Allen *et al.*, US Patent No. 6, 630, 566, (hereinafter "Allen").

The Examiner stated that it would have been obvious to one of ordinary skill in the art to incorporate the polymeric composition of Woo, Wu or O'Dell into a switching device as suggested by Allen because such utility is expressly suggested by the prior arts.

Applicants submit that dependent Claim 44 is novel and non-obvious over Woo, Wu or O'Dell, for reasons discussed in the sections of this paper responding to the novelty rejection over Woo, Wu or O'Dell. Allen does not disclose specific examples of phosphorous containing polymers. Therefore, it does not remedy the deficiencies of Woo, Wu or O'Dell over the claimed subject matter.

In the view of the above, Applicants submit that Claim 44 is non-obvious over Woo, Wu or O'Dell in further view of Allen. Reconsideration and withdrawal of the rejection under 35 U.S.C. §103(a) are respectfully requested.



**CONCLUSION**

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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